

INTENTION AWARENESS: REDUCING THE DIFFICULTIES IMPOSED BY MARTYRS

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Abstract

America has come to realize that threats from individuals willing to sacrifice themselves for their cause are as formidable as threats from hostile nations. Individuals who use themselves as weapons, and those who subject themselves to the same fate as their victims are considered martyrs to those with like beliefs. Technological advances have done little to thwart their efforts, as these modern day vigilantes attack small groups of civilians and opposing militaries alike.

Intention Awareness (IA) as an essential element of team play that guarantees that in times of uncertainty, an organization's subparts still function on the same accord. IA keeps all elements running like a well-oiled machine in the absence of direction and guidance from high-level decision makers.

This paper describes the research that must be performed in order to develop intelligent systems that are capable of analyzing, identifying, and detecting martyrs.

Keywords

Intention awareness, martyrs, martyrdom, adaptive learning systems, machine learning, suicide intent.

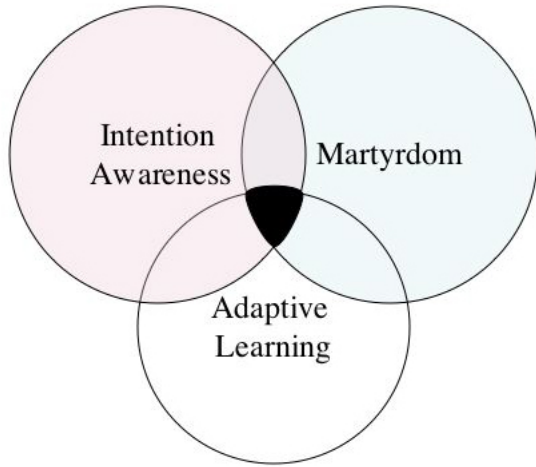
1 Introduction

In the wake of the events surrounding September 11, 2001, America realizes that it is no longer threatened by hostile nations as much as we are of individuals who are willing to sacrifice themselves for a cause

they believe in. Suicide bombers, kamikazes and those who knowingly use weapons that cause themselves the same fate as their victims have emerged as martyrs to fellow believers. At the same time, they have become the group of war fighters who are most difficult to control and hardest to detect during conflicts. We have come to realize that technological advances do little to thwart the efforts of these modern day vigilantes, as they attack small groups of civilians and opposing militaries alike. On a daily basis, they are engaged in what has seemingly become a war of attrition - a war in which martyrs are proving to be formidable opponents.

Following the rise in coalition caused casualties, Dr. Newton Howard proposed Intention Awareness (IA) as an essential element of team play that guarantees that in times of uncertainty, subparts of organizations remain on the same accord [5]. In large organizations, IA keeps all elements running like a well-oiled machine, even when direction and guidance from high-level decision makers are not available. It follows that as direct interactions among groups within the organization decreases, the need for Intention Awareness increases. In scenarios where these groups are distributed, during wartime for example, IA becomes a fundamental tool used to ensure all parts are working towards the organizational mission.

The martyrs of war described above provide a near-perfect model of Intention Awareness since these individuals carry out their organizational mission in remote locations without direct command. That being said, interesting questions include:



Adaptive Learning, Martyrdom and Intention Awareness

1. What can we learn about martyrs?
2. How can we use this information to detect potential martyrs that exist in our society?
3. Can organizational profiles be modeled using data obtained from and about past martyrs?
4. Can adaptive learning techniques be used to detect martyrs autonomously if a profile is given or if an organizational mission is known?

Our research strives to design an architecture based on the model of Intention Awareness proposed by Howard [5] which will move closer to answering the questions previously posed. The final result should model a system that could aid in the identification, analysis and detection of martyrs.

2 Background

The research area described in this paper is the intersection of three distinct research topics, as illustrated in Figure 2. The following sections describe Intention Awareness, Martyr Analysis, and Collective Learning Systems in more detail.

2.1 Intention Awareness

Command and control doctrines have experienced an influx in acronyms from C2 (command and control) to C3 (command, control, and communication) to C3I (command, control, communication, and intelligence) to C4I (command, control, communication, computers, and intelligence). To this list of acronyms, Howard [5] suggests adding an additional acronym Intention Awareness (IA). IA will improve situational awareness in zones of conflict by incorporating the intentions of the highest level of military commanders during war planning. According to Howard, IA is capable of informing others of the various intentions and motives which drive both present and future actions. A better understanding of high-level intentions by individuals that are closest to a battle may facilitate a reduction in uncertainty surrounding decision-making in dynamic battlefield environments. This decreased uncertainty will lead to improvements in the projection phase of situation awareness which will in turn lead to better informed decisions, enhancing the probability that the organizational mission is attained [5].

Intention awareness in military operations refers to the “degree to which one is aware of the commander’s intent” [5] and is ideally embedded in and communicated through operational orders. “Intention Awareness provides the ability to accomplish a mission in the absence of further guidance” [5]. From a tactical standpoint, this suggests that by ascertaining the organizational mission of one’s adversary, it becomes possible to deduce the future actions of the adversary’s subordinates. Not only can the capabilities of an adversary be assessed (such as their weaponry, military size and technologies), but also possible plans of actions that members of the organization might take. It is also possible that by analyzing the actions of both the subordinates and higher level commanders, the overall organizational mission can be deduced. In operations where the characteristics of the zone of conflict are changing rapidly, lack of clarity may arise as subordinate commanders assess their situations within the context of what they perceive to be the higher commander’s intent, but which in fact may not be reflective of the intent of the higher com-

mander. In these cases, identification of the organizational mission may be problematic.

2.2 Martyrs

Martyrs, or those who knowingly use weapons that cause themselves the same fate as their victims, have emerged as the group of war fighters that are the most difficult to control and hardest to detect during conflicts. Technological advances have done little to thwart their efforts as modern day martyrs attack small groups of civilians and opposing militaries alike on an almost daily basis. Wars that had previously been fought between militaries have become wars of attrition between militaries and martyrs - wars in which martyrs are winning.

President Bush has been quoted as saying, "we fight against poverty because hope is an answer to terror" [3]. This implies that he believes that martyrs (like gangs) are produced as a result of poverty - simply products of lower income ghettos. Others feel we are dealing with a group of irrational individuals who are erratic in their actions and typically show signs of social dysfunction [REF to support this here] "As logical as the poverty-breeds-terrorism argument may seem, study after study shows that suicide attackers and their supporters are rarely ignorant or impoverished. Nor are they crazed, cowardly, apathetic or asocial" [1]. On the contrary, most martyrs are intelligent, patient and very rational in the planning and execution of their goals. According to a 2003 article published in the New York Times, terrorists most likely live under relatively prosperous circumstances and most have at least 12 years of education. Those at the highest terror levels are educated well above this. They are also seemingly normal family members, and not the depressed misfits we would like to believe they are [1].

Our ideal definition of the martyr allows us to take comfort in thinking that we could identify a potential martyr through social interactions. However, we found out too late that the martyrs who led the attacks on America on September 11, 2001 "were adults with education and skill, not hopeless young zealots. At least one left behind a wife and young children. They mingled in secular society, even drinking forbid-

den alcohol, hardly typical of Islamic militants" [12]. In the homeland, we are finding people who have the same beliefs as the 9/11 martyrs so seamlessly integrated into our society, that their identification is almost impossible prior to their ultimate sacrifice.

2.3 Collective Learning Systems

On the battlefield, the distinction between civilians and martyr militants must be made under pressure. In the homeland, however, we tend to have time on our side. That being said, the utilization of the time, resources and data currently possessed must be used to minimally develop the framework for technologies that will assist in our quest.

Machine learning is the subfield of Artificial Intelligence that studies the automated acquisition of domain-specific knowledge. The goal of these systems is to improve their performance as the result of experience. One area of machine learning that has caught the author's attention is that of adaptive learning systems. As an alternative to preprogrammed rule-based Artificial Intelligence, an adaptive learning system is a hierarchical network of cellular automata which acquires its knowledge through learning. Knowledge acquisition is much like human learning in that it is based on a series of trial-and-error interactions with the evaluating Environment. The input to the hierarchical network is provided by a set of sensors, each of which perceives the external world and then causes the learning automata to synthesize a collection of trial responses based on current information and past experience (memory). Periodically, the automata estimate the effectiveness of these collections using either internal evaluations (unsupervised learning) or external evaluations from the Environment (supervised learning), modifying their memories accordingly [2].

Conventional computing works linearly but collective learning systems adapt to incorporate a holographic approach to memory that is closer in concept to the functioning of the human brain. Given properly developed profiles of previous martyrs, it should be possible to construct adaptive learners that are able predict to some degree of certainty the suicide intent of an individual based on certain information.

3 Research Areas

We argue that interdisciplinary research using empirical methods is needed in order to describe, understand and model martyrs. The systems produced from this research require that the following three areas be thoroughly explored: the organizational mission and intention awareness modeling, martyr analysis, and the development of an intelligent martyr identification system.

3.1 The Organizational Mission and Intention Awareness Modeling

According to Poderis [REF Here], "The Mission Statement declares "why" an organization exists, and is the only foundation upon which a long-range strategic plan (the blueprint for carrying out the organization's "business") can be developed." Every successful organization has a statement describing who they are, what they stand for and why. It is the creed that all members follow to promote the organization's success. It should follow from this that this document is by far the most important doctrine of any organization, and that by analyzing the organizational mission, several key features of an organization's actions can be deduced. Conversely, it may also be true that by identifying the actions of an organization's members, the mission may be deduced. We contend that by identifying the organizational intent of our enemy, it should be possible to rationalize the goals of not only the higher commander, but also those of subordinates.

3.2 Martyr Analysis

Dr. Rona Fields has conducted one-on-one interviews over a span of thirty years with persons living in environments known to produce martyrs. Some of these individuals did sacrifice themselves, but others whose information is just as detailed, chose not to become martyrs. It is this conflicting result that leads us to believe that a thorough analysis of the properties of both sets of these individuals can be used to produce a concise set of features that will help in building the profile used in detecting future martyrs.

Extracting enough information to build solid profiles based on the data gathered from past martyrs and the information collected by Dr. Fields will prove to be our greatest hurdle. We will use information from a subset of the martyrs to train our adaptive learners. "To reduce uncertainty an agent needs to predict situations, actions, and the over all environment in reference to his or her operating reality model. Therefore, one has to assume that there is a contextual pattern in situations and actions, i.e. there are repetitions and thus frequency of repeated activities" [5]. If repetitions in the martyrs' behaviors exist, then we must be able to deduce, define and structure models that are sufficient for use as test data for our experts.

By analyzing past persons who have either tried or completed martyrdom, we expect to minimally construct a martyr profile. We have several components which will facilitate our research to include the interviews recorded by Dr. Fields, the analysis of past martyrs and the knowledge of those who are currently willing to commit to martyrdom. These profiles should lead to a concise set of features that a large percentage of martyrs possess.

3.3 Intelligent Martyr Identification System Development

From the above research areas, it is clear that our system will rely heavily on the expertise of many sources prior to its implementation. We will rely on psychologists and military analysts prior to the inclusion of those responsible for building the actual collective learning system.

3.3.1 Required and Desirable Features

The success of our collective learning systems will rely heavily on the completeness and accuracy of the martyr profiles that are constructed. Well developed profiles will reduce the challenges of our system; incomplete martyr profiles will result in unnecessary false positives. Our profiles must attempt to extract essential characteristics without losing features that are common to both martyrs and non-martyrs. The

more we know about the martyr, the more intelligent our adaptive learners will be.

3.3.2 Technological Challenges

Adaptive learners are state-based systems which work best with quantifiable feature sets. In our case, we must therefore provide weights to the characteristics of the martyr profiles. One of the great technological challenges is assign the appropriate weight to each martyr characteristic. Once optimal values are found, thorough testing must be done to ensure that our adaptive learning systems are effective in martyr detection.

3.3.3 Expected Outcomes

Our collective learning system should be able to use profiles obtained via thorough martyr analysis to detect the intent of an individual based on their previous and present actions and behaviors. Conversely, our system should also be able to build profiles based on an organization's mission. The learning of behaviors in both contexts will be essential as new militant organizations are developed worldwide.

4 Future Work

Obviously a great deal of work lies ahead if we are to produce systems that rarely produces false-negatives in the detection of those whose intention is to commit to martyrdom. In that sense, would be doing no better than what is currently referred to as racial profiling. Our future work includes:

1. The creation of profiles based on thorough analysis of data collected through ethnographic studies performed over a span of thirty years by Dr. Rona Fields.
2. The development of a set of features based on these profiles that are found in a large portion of these profiles.
3. The development of a collective learning system based on these features.

4. The training of the adaptive learner based on the features.
5. The evaluation of the overall success of the expert.

5 Conclusion

Intention Awareness (IA) is an essential element of team play that guarantees that in times of uncertainty, the subparts of an organization are still on the same accord. In large organizations, IA keeps all elements running like a well-oiled machine, even when direction and guidance from high-level decision makers is not available. When these groups are distributed, i.e., during war, IA ensures that all parts work toward the organizational mission.

Martyrs of war operate using a near-perfect model of Intention Awareness whereby each individual carries out his/her organizational mission without direct command. We believe that by analyzing these martyrs, we can identify individuals that are prone to martyrdom. To this end, we proposed the development of an intention awareness model based on the organizational mission to which it corresponds. Using these two facts alone, we feel it is feasible to develop profiles by applying Dr. Newton Howard's IA data and analyzing interviews taken with martyrs prior to their acts. If robust profiles can be developed, then so too can adaptive learning techniques be applied to automate martyr identification.

References

- [1] Atran, Scott. "Who Want to be a Martyr?". The New York Times. May 5, 2003, Section A; Page 23; Column 2;
- [2] Bock, P., Rovner, R., Kocinski, C. J., Holz, H., and Becker, G. "A Parallel Implementation of Collective Learning Systems Theory: Adaptive Learning Image Analysis System (ALIAS)". ACM (May 1990): 457-469.
- [3] Remarks by the President at United Nations Financing for Development Conference. Cintermex

- Convention Center. Monterrey, Mexico. March 22, 2002. Retrieved from the Internet on 2004-04-27 at: <http://www.whitehouse.gov/news/releases/2002/03/20020322-1.html>.
- [4] Endsley, M. R. "Theoretical Underpinnings of Situation Awareness: A Critical Review". In Endsley, M. R., and Garland, D. J. (Eds.). *Situation Awareness Analysis and Measurement*. Mahwah, New Jersey: Lawrence Erlbaum Associates, 2000, pp. 3-32.
- [5] Howard, N., Dr. *Theory of Intention Awareness in Tactical Military Intelligence: Reducing Uncertainty by Understanding the Cognitive Architecture of Intentions*. Bloomington, Indiana: AuthorHouse First Books Library, 2002.
- [6] Johnson, D. E. A. "Avoiding the Stellenbosch Syndrome". Washington, D.C.: Center for Advanced Defense Studies, 8 November 2003. Retrieved from the Internet on 2004-03-24 at: <http://www.snipercountry.com/Articles/AvoidingStellenboschSyndrome.asp>.
- [7] Marsh, H. S. "Beyond Situational Awareness: The Battlespace of the Future". Washington, D.C.: Office of Naval Research, 20 March 2000. Retrieved from the Internet on 2004-03-24 at: http://www.onr.navy.mil/sci_tech/information/docs/beyond_sav.2.pdf.
- [8] Miller, N. L. and Shattuck, L. G. "A Process Model of Situational Awareness for Command and Control Systems". A paper presented at the Command and Control Research and Technology Symposium, 2004. Retrieved from the Internet on 2004-03-24 at: <http://www.dodccrp.org/Activities/Symposia/2004CCRTS/abstracts/199.pdf>.
- [9] Parekh, R., Yang, J., and Honavar, V. "Constructive Neural-Network Learning Algorithms for Pattern Classification". *IEEE Transactions on Neural Networks* 11 (March 2000): 436-451.
- [10] Poderis, Tony. "Don't Make Your Organization's Statement Of Purpose A 'Mission Impossible'". Retrieved from the Internet on 2004-03-24 at: <http://www.raise-funds.com/1101forum.html>
- [11] Major Andrew D. Walker, USMC, *The Nature Of War And The Realities Of The Modern Battlefield*.13
- [12] Wilgoren, Jodi. "A Terrorist Profile Emerges That Confounds the Experts". *The New York Times*. September 15, 2001.