AI as a 30+ Year Florida Statewide Strategic Initiative

30 YEARS ANNIVERSARY OF FCRAR AND FLAIRS

I. A STATE OF FLORIDA INITIATIVE

Approximately 30 year ago, in 1987, an effort of the state of Florida was channeled toward the exploitation of the local intellectual and technical infrastructure for the advancement of local research, in particular through the support and organization of conferences. Groups of scientists from the main Florida universities and representing various key research fields were invited to Tallahassee and encouraged to discuss ways of organizing events, such as local conferences, that would support their technical or scientific activities.

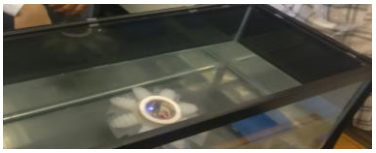
Among these groups, two focused on research directions that are currently converging into topics related to intelligent informatics. These were the group specialized on artificial intelligence (AI) and the group specialized on robotics. Each of the two groups ended up giving rise to a corresponding successful conference, while each of them followed a very different approach towards a distinct vision. The artificial intelligence group decided to create a research society and an international conference, FLAIRS (Florida Artificial Intelligence Research Society), that would bring together researchers from all over the world, exploiting not only the local research base but also the available rich local attractions. The robotics group decided to construct an intimate conference, FCRAR (Florida Conference on Recent Advances in Robotics), coaching local graduate students on research. FLAIRS became a top scientific conference with indexed proceedings while FCRAR is a vibrant conference with free registration and "lightly" reviewed online proceedings.

FLAIRS: Plenary Session

II. FCRAR 30: THE 30TH FLORIDA CONFERENCE ON RECENT ADVANCES IN ROBOTICS

The FCRAR 2017 conference was organized during May 11-12 at the Florida Atlantic University (FAU) by Dr. Oren Masory and Dr. Zvi Roth. The conference is a traditional venue for presenting ongoing robotic research in a formal environment. It has originally focused on the mechanical part of robotics but artificial intelligence proved to be inseparable from its topic and is now addressed by a significant part of the presentations.

As with previous editions, the 2017 FCRAR did span over two days. In most years FCRAR is a single track conference. However, two parallel sessions were needed this year for the 49 regular articles accepted. Still, the whole attendance met for the first session and welcome message, as well as for the three valuable invited talks:



FCRAR Robotic Jellyfish Demo

A. The first invited talk, by Dr. Andrew Goldenberg, Professor Emeritus from the University of Toronto, provided insights from his rich experience with transferring technology from academia to industry, as well as to the market size and trends for various types of robots. A glimpse was offered into the extent to which robotics is planned to quickly replace significantly more service jobs in the fast food industry. His advice to students stressed the fact that challenges remain mainly with the artificial intelligence component, which persists as an important constraint and bottleneck of the democratization of the robot. Challenges posed by the development of robots for prostate surgery under MRI, as well as exploitation of IP in academia made the subject of most questions after the talk.

FAU Robotic Lab Expo.

B. The invited talk of Dr. Deborah Nagle focused on her experience as a robotic surgeon and researcher with surgery robotics. A detailed account was given of the stages of evolution in robotic surgery, as well as of difficulties faced by surgeons in using the equipment. The emphasis was put on the desire of surgeons to get more help in terms of machine learning techniques, to help them during medical procedures. While the surgery robotics market is hard to penetrate, the speaker explained challenges by newcomer Google to the established DaVinci manufacturer.

C. The third invited speaker was University of Florida's Dr. Gloria Wiens, Director of FloridaMakes BRIDG, who described governmental efforts for supporting local innovation with current projects in domains such as smart kitchens and smart agriculture. Most questions from attendees concerned the history of results earned by similar centers.

The conference also contained a robotic expo session where, under the leadership of Dr. Erik Engeberg, participants were shown the robotic jellyfish manufactured at the FAU, as well as their large collection of robotic arms and sensors. Visitors experimented with the control of industrial robots

using gloves, thought, or other techniques to simply capture and replicate human motion or desires.

In regular sessions, presenters addressed various robotic prototypes as well as machine learning techniques to learn patterns and interpret images. New machine learning techniques for detecting seizures in EKG and recognizing fish sounds using Slantlet transforms were described by Ibrahim. Search heuristics described by Medina were part of AI techniques to explore space in NASA Swarmathon. ID3-like entropy reducing decision tree building heuristics were described by Ballard for eye in arm robots exploring workspaces. Heuristics for graph traversal used in remote laser-based soldering of cracks detected visually were described by Findling, while Drada discussed regular soldering systems. A family of path-planning techniques for inspection of nuclear waste tanks were described by Sebastian Zanlongo, extending A* and Disjktra's algorithms with heuristics modeling details concerning travel difficulties and tether cables. Other addressed robotics applications include intelligent robots to carry luggage, the BudeE robot for surveillance of children, vertical farming, construction robots, autonomous buoys. AI related problems addressed span strategy planning, path-planning algorithms, component failure prediction, user trust, and frustration management.

III. FLAIRS 30: THE 30TH FLORIDA ARTIFICIAL INTELLIGENCE RESEARCH SOCIETY CONFERENCE

The 2017 FLAIRS conference was organized by Dr. Ingrid Russell during May 22-24 at the Marco Island Hilton Hotel. As in previous editions, a set of special tracks was integrated with the main conference, each special track having its own topic and program committee. Acceptance criteria were unified by the program committee consisting of Vasile Rus, Zdravko Markov, and Keith Brawner. This edition accommodated 17 special tracks and 192 participants. The conference program was organized in sets of 4 parallel sessions for the 103 accepted full papers. A poster session was held during the first afternoon session on the first conference day. There were 61 posters, 25 of them having an abstract published in the proceedings that has undergone a separate reviewing process, while the rest corresponding to accepted short papers. Six papers were nominated for the best paper and best student paper awards.

Recent FLAIRS editions include lunches and dinners in the registration package, reducing noon breaks and helping participants to interact and discuss collaborations, one of the appreciated strengths of the conference. There were four special track invited talks, presented in parallel sessions and three main conference invited talks presented in plenary sessions:

A. *The first invited talk was offered by Thomas Dietterich, on "*Robust Artificial Intelligence: Why and How*". It was suggested to address lack of robustness by modeling randomness as an attacker, using minimax. General AI can take inspiration from the field of Automatic Speech Recognition (ASR) where noisy bands are detected based on unlikely repetition of phonemes. Four ideas emerge:*

1) Employ anomaly detectors
2) Use dynamic model extensions
3) Use causal directions, as they work better than diagnostic models
4) Combine techniques

Citing Minsky: "*You understand only if you understand in multiple ways*".

Public questions addressed: evolution, impact of small errors and wrong datasets, advantage of ensemble methods (portfolios) over thinking too much, and difference between building incomplete models versus building causal models. Science studies causal relations while engineering is satisfied with incomplete models. While ASR was improved with more data, that may not work for adversarial situations. Accordingly DARPA has a project on "Explainable AI".

B. The second plenary invited talk was delivered by Prof. Jiawei Han on "Mining Structures from Massive Text Data: A Data-Driven Approach". The speaker presented his research in using large text data sets to create relatively structured networks, usable as knowledge. Questions raised the challenge of approximate knowledge needed to answer queries such as: "*Who is the President of England?*" and representation of nested concepts such as "*President of [United States]*".

C. The third plenary invited speech was given by Dr. James Allen on broad-coverage deep language understanding. The challenge question was for a definition of deep understanding. It was suggested that solutions include: no word left behind, preservation of details, preservation of ambiguity, and preservation of compositional structure. The TRIPS word organization capturing common sense semantics, proposed by the speaker, was contrasted with WordNet. Comprehensive dictionaries are now parsed to build ontologies. It was stressed that words are used for arguments rather than relations. Disambiguation is achieved by filtering semantics based on annotations and temporal constraints. However, construction & composition require


FLAIRS Awards Ceremony

invention of new semantics as in "*The dog barked the cat up the tree*". The questions addressed: parsing of emoticons, dots, templates of allowable constructions, different semantics, complex world in long novels, non-English text.

The "*Radical-Based Hierarchical Embeddings for Chinese Sentiment Analysis at Sentence Level*" by Peng et.al. won the best paper award. Natural language processing is one of the main strength of the FLAIRS community, but most other AI branches are represented.

31th FLAIRS and 31th FCRAR will take place during May 2018.

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