HUGIN-IET TRAINING – MODULE OVERVIEW

IET has teamed with Hugin Expert to deliver three days of Hugin training at IET offices in Arlington, Virginia. Hugin Expert trainers provide the first two days of training on the Hugin tool kit and IET provides the third day of training for application development and implementation.

Hugin's portion of the training covers Bayesian Networks, how to build knowledge bases using Hugin's graphical user interface, how to analyze results, and programming using the Hugin Decision Engine. It contains a large number of examples, exercises, and hands-on experiences. There are both theoretical and practical exercises. The practical exercises are solved using the Hugin Developer (trial version). For more information on Hugin's portion of the training and to enroll, please visit: http://www.hugin.com/Products_Services/Services/Training/.

HUGIN BN-COURSE – 2 DAYS

MODULE OBJECTIVES

When the trainee completes this module s/he will have acquired the following knowledge, methodologies and capabilities:

- Fundamental understanding of Bayesian networks and influence diagrams.
- Fundamental understanding of the modelling process, including object-oriented modelling.
- Methodology and templates for model development, including tips and tricks for improving model efficiency.
- Capability to apply the Hugin Graphical User Interface for efficient model development.
- Capability to program with the Hugin Decision Engine for application development.

REQUIREMENTS AND MATERIAL

The two main prerequisites of the course are limited knowledge of how to use a computer and basic mathematical skills.

The course is based on the following books: "Bayesian Networks and Decision Graphs" by Finn V. Jensen, "Probabilistic Networks and Expert Systems" by Cowell, Dawid, Lauritzen, and Spiegelhalter.

The course material includes a CD-ROM with course slides, trial-licenses to Hugin Developer and Hugin Advisor. Each student will also receive a set of hardcopy slides.

HUGIN TRAINING PROCESS

The 2-day Hugin course gives the participants a fundamental introduction to Bayesian networks and influence diagrams through a combination of theory and practice. The theory is limited to supporting the intuitive explanation of different features of Bayesian networks and influence diagrams.

The course is organized into a set of sessions. Each session considers a particular topic, which will be explained in detail using examples and hands-on examples. For instance, one topic is Bayesian networks while another topic is modelling techniques for Bayesian networks. During each session, students will have the opportunity to perform hands-on examples on their own PC. To perform the hands-on examples, each student will have access to the Hugin Developer tool.

The topics considered in the course are as follows:

DAY 1:

- Introduction

- Graphs and causal networks

- Bayesian probability theory

- Bayesian networks

- Interacting with the Hugin Decision Engine through an API

- Modelling techniques for Bayesian networks (I)

DAY 2:

- Modelling techniques for Bayesian networks (II)

- Learning and adaptation of Bayesian networks from data

- Decision and utility theory

- Influence diagrams

- Modelling techniques for Influence diagrams

- Object-Oriented network models

COURSE DESIGN ROADMAP

Basic graph theory. Concepts of graph theory central to Bayesian networks and influence diagrams are discussed to give the course participants a common knowledge and understanding of graphs and a common terminology.

Basic probability theory. Concepts of probability theory central to Bayesian networks and influence diagrams are discussed to give the course participants a common knowledge and understanding of probability theory and a common terminology.

Bayesian networks. Based upon the concepts of the previous two sessions, Bayesian networks are introduced. A Bayesian network is a graphical model for reasoning under uncertainty.

Interacting with the Hugin Decision Engine through an API. The functionality of the Hugin Decision Engine is considered from a practical point of view. It is shown how to load and interact with Bayesian network models using an Application Programming Interface for the Hugin Decision Engine.

Modelling techniques for Bayesian networks (I&II). A number of useful tricks for the construction of Bayesian networks are presented. These tricks deal with the expressiveness and efficiency of the model representation and the efficiency of inference.

Learning and Adaptation of Bayesian networks from data. The construction of Bayesian network models from data is considered with respect to estimating the structure, the parameters, and both from a combination of expert knowledge and data. The adaptation of parameters over time is also considered.

Decision and Utility Theory. Concepts of decision and utility theory central to Bayesian networks and influence diagrams are discussed to give the course participants a common knowledge and understanding of graphs and a common terminology.

Influence Diagrams. Based upon the concepts of the previous session, influence diagrams are introduced. An influence diagram is essentially a Bayesian network augmented with utility and decision nodes. An influence diagram supports decision making under uncertainty.

Modelling Techniques for influence diagrams. A number of useful tricks for the construction of influence diagrams are presented. These tricks deal with the expressiveness and efficiency of the model representation and the efficiency of inference.

Object-Oriented network models. Object-oriented network models allow for hierarchical construction of models. This eases the model building and enables model reuse.

IET COURSE – 1 DAY

MODULE OBJECTIVES

When the trainee completes this module s/he will have acquired the following methodologies and capabilities:

- Capability to plan and execute a project involving solving a problem or performing a reasoning task under uncertainty.
- Methodology for proceeding through the project in an organized, structured manner.
- Methodology and templates for project planning tasks.
- Capability to apply methodologies, templates, and Hugin software in a classroom example set up to model a real-world project.

IET TRAINING PROCESS

This one day training class is built in conjunction with the Hugin Training Class. It centers on a methodology that IET successfully uses on customer sites. It is illustrated by a vertical example that is evolved through the course.

DAY 3:

The presentation order is as follows:

- Representation of approach to use; (1/8 day)

- Overview of Process Lifecycle; (1/8 day)

- Understanding of Project Phases; (1/8 day)

- Role of Quality Management Systems / Documentation; (1/8 day)

- Mapping a real world example to the above process; (1/2 day)

Each student receives a set of hardcopy slides to follow and a soft copy of documentation templates. Students are encouraged to bring their own PCs, with Hugin and Microsoft Word pre-loaded. That enables them to perform the hands-on example on their own PCs, so that by the end of the class they have personally implemented a project using the structured process covered.

COURSE DESIGN ROADMAP

The following five subsections provide the content for the steps described above:

Approach. First, it is essential to decide upon an approach that will be adhered to within a project. The approach is important because it draws the roadmap to use in the project, going from where you currently are to where you want to be. The steps to take along the way are covered in the process lifecycle and project phase sections. This section covers three different approaches that are examined to determine the best method of tackling each particular project. The "best" approach to use may be decided based on the type of project, available funding, corporate commitment, or timeline issues. These approaches help delineate the amount of detail that is contained in each step of the process. They include: Exploratory Development, Production Implementation, and Advanced Implementation.

Process Lifecycle. This section covers a quick overview of the process lifecycle that is used in projects. It is important to understand the lifecycle or process that will be followed throughout the project because they identify the steps that will be followed for each project phase. IET uses a spiral model for systems engineering. This model views system development as a repeating cycle of analysis, design, development, operation, and evaluation. Each phase is used as a structured approach to examine lessons learned and plan the next cycle of the development effort.

Project Phases. This section details the different phases each project must pass through in a structured manner to ensure the project's success. A good understanding of the different phases before beginning any project is essential … it is your roadmap to your destination. Specifically, we discuss Project Analysis, Strategy and Planning, Knowledge Elicitation / Modeling, Development, Testing, and Deployment / Integration.

Quality Management System / Documentation. This section discusses the importance of a Quality Management System. Additionally, it covers the documentation needed and some templates that IET includes to facilitate the process. This is important because it ensures delivery of high quality product.

Real World Project. This part of the course turns theory and process into reality and experience. It applies all the material that was covered at the beginning of the day into structuring a project for a real world example. Students will proceed through the above process to model the project using Hugin. They can then take this structured project approach back to their offices and use it as a model for their specific work projects.

PRACTICAL INFORMATION & PRICES

LOCATION:

IET

1911 NORTH FORT MYER DRIVE

SUITE 600

ARLINGTON, VIRGINIA 22209

USA

DATE:

The next Hugin-IET Training course offered in the US will be held from 8 – 10 August 2006.

PRICE:

The course price is US $2,475 per participant. For students we offer a 20% discount.

FOOD:

The course price includes the following: Morning coffee, Lunch, and Afternoon drinks. There will be coffee and cold soft drinks throughout the day.

REGISTRATION:

To register, please go to: http://www.hugin.com/Products_Services/Services/Training/ or fill in the attached registration form.

DIRECTIONS TO IET'S VIRGINIA OFFICE

For directions to IET's Virginia office, please look at: http://www.iet.com/about6.html

COMPUTER REQUIREMENTS AND COURSE MATERIAL

The student should bring his/her own portable computer, with Hugin installed**.**