Knowledge Acquisition Techniques

Case Studies
دانش در ذهن خبره و در پایگاه دانش

ساختن سمت چپ در شکل ۱۳-۳، گونه‌ای از نقشه‌های دانش یک خبره در یک دانه است.

برق: فرضیه سیستم نماد فیزیکی چیست؟

Physical Symbol System Hypothesis
تکنیک‌های اکتشاف دانش

درک اصلی و روش از جهت
فهمیدنی
بیدادگیری
توسط دهن درک می‌شود
دارای محدوده مشخص است
تجربه، عملی، مهارت

در کتاب اصلی و روش از جهت
فهمیدنی
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تجربه، عملی، مهارت

تکنیک: اکتشاف و دریافت دانش، توسط مهندس دانش انجام می‌شود (شکل 13-1)، ویژگی‌های فردی مهندس دانش

اعتماد به نفس
تخصص در مهندسی دانش
هوش همبردی و برده‌ی
ثبت قدمی
فکر منطقی
خلاص‌ت، ابتکار و همه کاره بودن.

مهارت‌های کامپیوتر
تحمل پذیری و انعطاف
توانایی ارتباط برقرار کردن
آموزش‌های متعدد دیدن
بیدادگیری سریع
درک افراد و گروه‌ها

دریافت دانش

انیابست، انتقال تخصص حل مساله از یک منبع دانش به پایگاه دانش را دریافت دانش گوبنده، برای این منظور، مهندس دانش با تعامل با افراد خبره، دانش او را گرفته و آن را به پایگاه دانش اضافه می‌کند. فرآیند دریافت دانش شامل مراحل زیر است:

درک مسئله و ویژگی‌های آن

درک کردن

شناسایی و درک
فهمیدن
فرموله کردن
اجرای آزمایش

فهمیدن

فرموله کردن

اجرای آزمایش

نظریه‌ساختار برای سازمان‌دهی دانش

تطریص وکاله‌کننده برای سازمان‌دهی دانش

فرموله کردن قواعد معامله برای دانش مهندسی

اجرای آزمایش

اعتبار نهایی قواعد سازمان‌دهی دانش

شکل 13-4: فرآیند دریافت دانش

مدرس: کمال سرشار
The basic model of knowledge engineering portrays teamwork in which a knowledge engineer mediates between the expert and the knowledge base. Figure 13-5, shows the following tasks performed by knowledge engineers at different stages of knowledge acquisition:

- Advise the expert on the process of interactive knowledge elicitation.
- Set up and appropriately manage the interactive knowledge acquisition tools.
- Edit the unencoded and coded knowledge base in collaboration with the expert.
- Set up and appropriately manage the knowledge-encoding tools. Validate application of the knowledge base in collaboration with the expert.
- Train clients in effective use of the knowledge base in collaboration with the expert by developing operational and training procedures.

**Note:** The elicitation of knowledge from the expert can be seen as a process of modeling and can be done manually or with the aid of computers. Most manual elicitation techniques have been borrowed from psychology or from system analysis.
Example: Site Selection for a Hospital Extension Clinic

Here is a simple hypothetical example of acquisition of knowledge about site selection for a hospital extension clinic. The dialog between the expert (E) and the knowledge engineer (KE) might start like this:

E: I understand that you are somehow going to try to capture my knowledge about site selection of clinics so that hospital administrators in our system in other cities can use it.

KE: Yes, indeed! And thank you for spending time with me, Kathleen. We’ve noticed that you have a special knack for identifying the right locations. So far, you’ve picked very successful operations.

E: Well, thanks.

KE: So, tell me, what’s the most important factor in determining where to put a new facility?

E: Really, it’s demographics. We need to locate it close to our potential customers.

KE: So, is it also important that it not be too close to another agency’s operation?

E: Not necessarily. It is important that it not be located too close to our main hospital or our other facilities, but if the population density is high enough, we can locate it close to a competitor.

KE: Tell me, then, what kind of demographics are you looking for?

E: Well, in a large city, if there are at least 2,000 people per square mile over about four square miles, generally they can support a profitable clinic.

KE: What about competitors’ locations?

E: If a competitor is within two miles, the density has to exceed 3,500 people per square mile. And if there are two competitors within two miles of each other already, there’s no point in even trying to break into the market, except for certain special services.

KE: What about the population’s income? Is that important?

E: We must limit our indigent cases to no more than 2 percent of our clients, and so we generally look for an average family income greater than $30,000 per year.

KE: Is being near public transportation important?

Note: By interviewing the expert, the knowledge engineer slowly learns what is going on. Then he or she builds a representation of the knowledge in the expert’s terms. The process of knowledge acquisition involves uncovering the attributes of a problem and making explicit the thought process (usually expressed as rules) that the expert uses to interpret them.
Knowledge Acquisition Techniques

Exercise 13-1: In Figure 13.6, the different knowledge acquisition techniques depending on the type of knowledge (formal, informal, explicit and tacit) are mentioned. Each method has its own advantages and disadvantages.

Exercise 13-2: The knowledge engineer identifies one method for each stage of knowledge acquisition. KA

Exercise 13-3: In the field of human-centered design, knowledge extraction, how to extract knowledge from human experts (Figure 13.7), and how to interpret knowledge.

Figure 13-7: Knowledge extraction by experts in human-centered design (Scriber et al., 2000)

Judge of a man by his questions rather than by his answers.

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Translator: Faramarz Khorsandi