知模型与 MBUID 开发框架相结合的系统[24],依据用户界面元素特征来预测任务执行中的错误,使设计的用户界面尽可能避免用户错误操作;

- DynaMo-AID 动态任务模型[25],它在 CTT 模型的基础上增加了上下文相关的决策点,依据运行时刻的使用上下文信息来选择子任务,动态生成对话模型;
- Klug 等人提出了一种可执行的任务模型 Executable Task Model[26],为每个任务增加输入/输出端口,实现任何两个任务之间的信息交换操作,使得在动态环境中任务组织更加灵活;
- 为了保证系统的可信性,Martinie 等人提出了 HAMSTERS 方法[27],针对在使用软件过程中可能出现的异常情况及其应对策略进行分析,将由系统或者人类导致任务失败时所需要执行的活动序列整合到任务模型中;
- Gaulke 等人提出一种增强执行规则的任务模型 Rule-Enhanced Task Model[28],在 CTT 任务模型的基础上增加了规则语言,将领域模型与任务模型紧密结合,在任务模型中嵌入业务逻辑,更精确地描述了任务的执行过程.

上述工作对 PCTBTA 方法具有启发意义,但以上研究仅仅是针对实际工作中某一个具体问题,对现有任务模型在某一个方面的改进,每个工作都有各自的侧重点.而 PCTBTA 方法则更加全面、更加系统地描述了普适计算环境中基于任务模型的界面生成过程,包括任务分析的思想、任务建模、任务表示符号以及从抽象描述到界面模型的转换过程,相对于上述工作具有更广泛的应用领域.

7 结束语

为了提高 MBUID 生成用户界面的可用性,本文提出一种基于 PCTBTA 任务模型的用户界面开发框架,探索一种更加适用于建模普适计算环境中用户任务的方法,并且为这种概念化方法到用户界面原型的转换提供了技术支持.与其他任务模型相比较,PCTBTA 任务模型的优势主要表现在:

(1) 描述能力更强:不仅能够描述一般情况下用户与系统的交互过程,也能够描不同使用上下文中用户、环境与系统的交互过程;

(2) 有较好的可复用性和可扩展性:在 PCTBTA 方法中,设计者可以将那些常见的、反复出现的任务集合定义为一个 PCTU,它不仅包括常见任务的重复使用,也包括对诸如用户及使用上下文、领域知识、设计知识等的复用.当有新的用户需求,或者有新的使用情境,亦或有新技术的出现,设计者可以添加新的 PCTU.这种方法提供了分析内容的扩充机制;

(3) 技术无关性:PCTBTA 方法为设计者提供了一套带有语义的任务描述符号,使得设计者在设计过程中,只需要关用户任务的描述,而无须考虑复杂的开发过程.

随着人们生活的物理空间和信息空间的不断融合,用户与系统的交互范围不仅限于单用户和单系统、多用户和单系统,而是单用户和多系统、多用户和多系统之间的交互.在这种多维度交互空间中,用户的任务也变得更为复杂,任务的执行需要跨越多个计算环境.本文后续的工作主要集中在:如何在原有理论基础上,结合不同设备不同系统的特征,动态组织环境资源来完成相应的任务,并且始终保持任务执行的连续性,让用户在普适环境中与各个设备实现无缝的交互.

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