How to Diagram a Dramatic Story

Sabah Al-Fedaghi

Computer Engineering Department, Kuwait University, Kuwait.
`sabah@alfedaghi.com`

Abstract. It has been proposed that UML diagrams are able to describe certain situations and can be used as instruments for reconstructing the dramatic progress of fictitious or real text. This paper claims that these diagrams are conceptually fragmented and proposes a new type of diagram for this purpose.

Keywords: conceptual modeling, UML diagrams, flow model.

1   Introduction

According to Tagliati and Caloro [1],

> *The problem of identifying new tools that the dramatist and/or director can use to analyze a text arises. Among these tools, it is important to select which is to be used in order to facilitate the sharing of the project among the different participants... The discipline of computer science can provide us with a valid solution to this problem, where comparable problems are, typically, solved by means of UML.*

Tagliati and Caloro [1] selected the episode Ecuador by Aristides Vargas, an Equadorian (see appendix A), in a work created by six Latin American dramatists to bring attention to the problem of thousands of abandoned children wandering the streets of big cities in the Third World. A short description of the text [2] is as follows. For the sake of brevity, only parts of the description are included.

> *A doctor, helped by his male nurse, trades in human organs, removed from innocent children. These organs are sold to him by their desperate parents…*
> *The male nurse, on the other hand … is poor and miserable, though with a grain of conscience left… So … [he] tells everything to the doctor's wife, who, unaware until that moment …*

Tagliati and Caloro [1] analyzed the episode by first using semiotics tools to identify all the important elements. They then applied UML to the text to study "the possibilities of a dramatic interplay which can occur between set and technological displays, between natural and not natural language and between action on stage and systems" [1].

2   The Flow Model (FM)

The flow model (FM) has been used in several applications [3-4]. A flow model is a uniform method for representing things that "flow," i.e., things that are created, processed, released, transferred, and received. "Things that flow" include information, materials (e.g., goods), and money. FM can be used to draw scenarios of events. A scenario is typically defined as a narrative or story that includes actors, activities, and objects. In FM, the basic structure of a scenario can be defined in terms of generic connected stages, with things flowing through this structure.

FM representation is a depiction of the structure of a scheme resembling a road map of components and conceptual flow. A component comprises spheres (e.g., those of a company, a robot, a human, an assembly line, a station) that enclose or intersect with other spheres (e.g., the sphere of a house contains rooms which in turn include walls, ceilings). Or, a sphere embeds flows (called flowsystems; e.g., walls encompass pipes of water flow and wires of electrical flow).

Things that flow in a flowsystem are referred to as flowthings. The life cycle of a flowthing is defined in terms of six mutually exclusive stages: creation, process, arrival, acceptance, release, and transfer.

Fig. 1 shows a flowsystem with its stages, where it is assumed that no released flowthing flows back to previous stages. The reflexive arrow in the figure indicates flow to the Transfer stage of another flowsystem. For simplicity's sake, the stages Arrive and Accept can be combined and termed Receive.
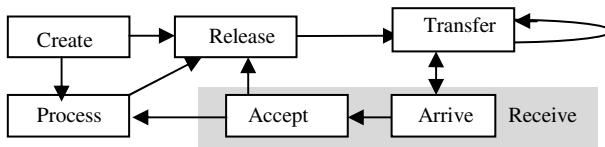

Fig. 1. Flowsystem

The stages of the life cycle of a flowthing are mutually exclusive (i.e., a flowthing can be in one and only one at a time). All other states or conditions of flowthings are not generic stages. For example, we can have stored created flowthings, stored processed flowthings, stored received flowthings, etc.; thus stored is not a generic stage. In contrast, there are no such stages as created received, or processed received stages. Flowthings can be released but not transferred (e.g., the channel is down), or arrived but not accepted (wrong destination).

In addition to flows, triggering is a transformation (denoted by a dashed arrow) from one flow to another, e.g., a flow of electricity triggers the flow of air.

Example: Formal models of narrative phenomena have been proposed in many applications, e.g., multimedia archives [5]. Schank (e.g., [6]) developed conceptual representations to be applied in story understanding systems, using a so-called conceptual dependency graph (CDG) to represent knowledge. The events of a narrative are represented abstractly through states that set the scene for the next event, and

events impact states and cause new states to form. "*However … When encoding the events … narrative details may be lost and when reconstructing the event the original rendition of a scene is not always preserved*" [5].

Vassiliou [5] presents an example using a CDG of the film The English Patient in a scene that includes Hana (a nurse) losing her friend Jan in a jeep explosion. "The scene has 29 shots and is one minute and 40 seconds long" [5]. Fig. 2 shows the resultant CDG.
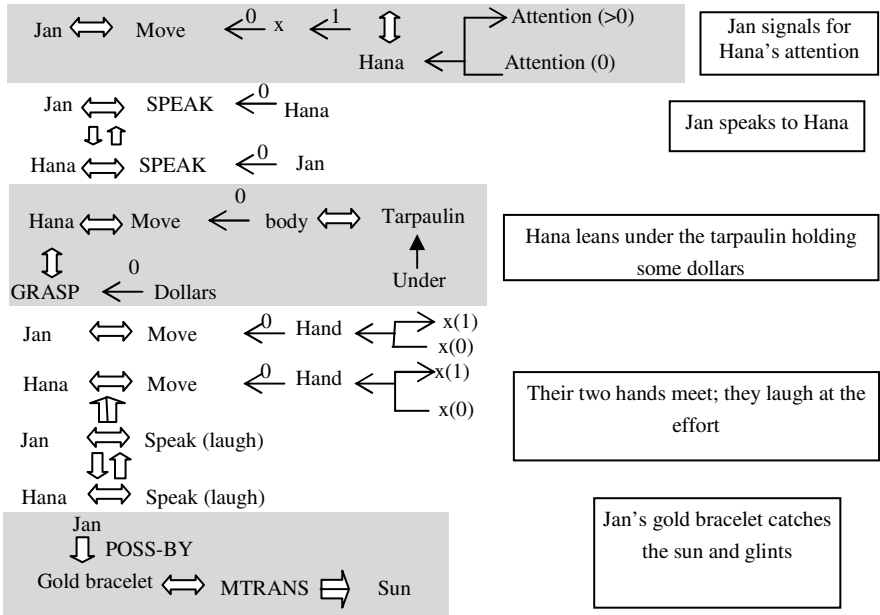
Fig. 2. A scene from *The English Patient* demonstrated in terms of Schank's conceptual dependency grammar (partial figure, redrawn from [5])

Fig. 3 shows the corresponding FM representation, with spheres of Jan (circle 1) and Hana (2). Hana is a subsphere of the JEEP sphere (3). Jan generates signals (4) that flow (5) to Hana, who processes the signals (6; e.g., recognizes them). Accordingly, her processing triggers (7) Hana to generate (8) a response (e.g., waving a hand) that flows (9) to Jan to be processed (e.g., 10, focusing her attention). This triggers Jan to speak (11) in speech that flows (12) to Hana to be processed (e.g., understood), triggering (14) a response (15) that flows (16) to Jan (17), who in turn creates a response (11). The rest of the diagram can be described in a similar manner.
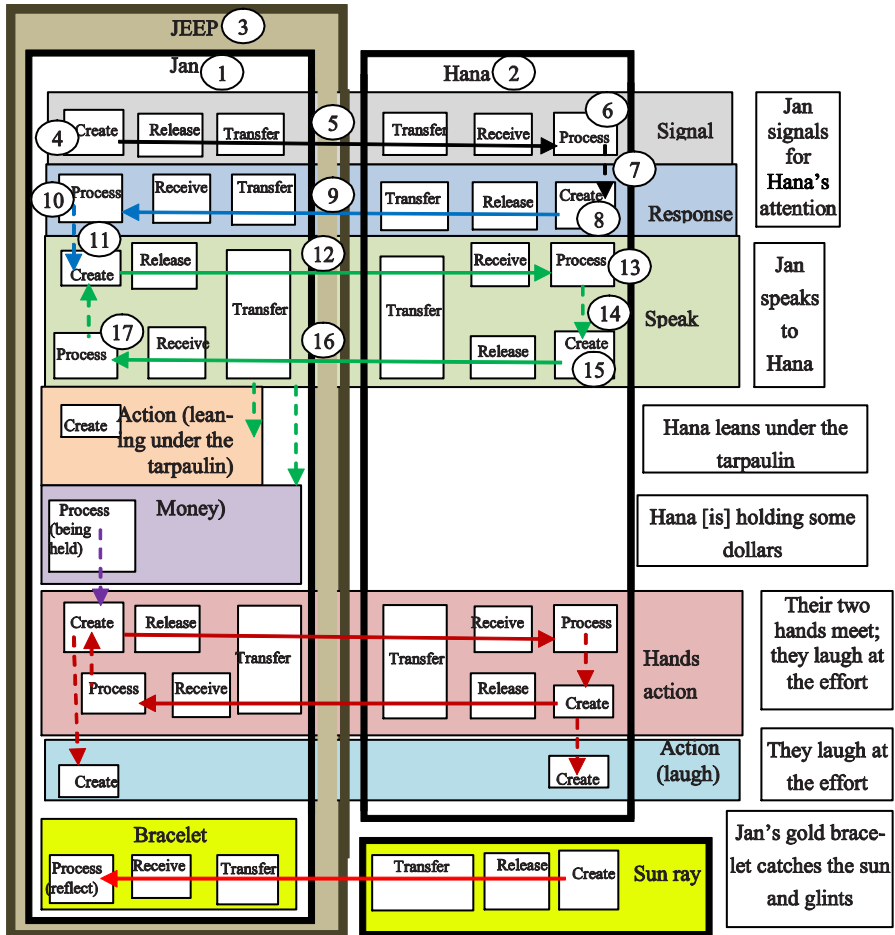
Fig. 3. A scene from The English Patient demonstrated in terms of FM

3   FM Representation of the Episode *Ecuador*

Fig. 4 shows the FM representation of the episode Ecuador, mentioned previously. It comprises seven spheres: child, doctor, buyer, parent, nurse , wife, and authority. We start the explanation at the child's sphere (circle 1 in the figure), which has one flow-system, in which the organ is the flowthing. The organ is processed, that is, removed, to flow to the doctor's sphere (circle 2). Receiving of an organ by the doctor triggers (3) a negotiation among the doctor, buyer, and parent. Note that the deal is also a flowthing that can be created, released, received, … The doctor creates a proposal (4) that flows to the buyer and/or the parent (5 and 6). When a buyer receives a proposal (7), he or she processes it (8), and may create a counter proposal (9), then sends it to the doctor (10). Similar communications occur between the doctor and the parent. The last acceptable deal is processed by the doctor, triggering (11) transfer of the organ to the buyer (12).

The nurse has a flowsystem of assistance (13) that is created and flows to the doctor (14). Note that assistance is a flowthing that can be created (generated) transferred, received, … Also, the nurse creates information (15) and releases it (16) to the wife. Upon receiving (17) this information, the wife informs (18) the authority. The authority receives (19) the information and processes it (20), and this triggers (21) sending (22) the doctor himself to jail (23).

Fig. 4. FM representation of the episode *Ecuador*

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