

Beat-Event Detection in Action Movie Franchises

Supplementary material

This document is organized as follows. In section 1 we describe the annotation protocol. In section 2 we show the mapping of the B.Snyder's beats to our beat-events.

1 Annotation protocol

First of all, each movie is pre-segmented into a sequence of shots using a state-of-the-art shot detector. Then, during the first annotation round, we annotate each shot by assigning it to one or several of the semantic beat-categories detailed below. In the second annotation round, we fill the gaps in the groups of shots that semantically belong to a single beat-event. Note that, in this way, temporal boundaries of beat-events always coincide with shot boundaries.

We consider the following 11 classes (*beat-categories*):

- *pursuit*: villains are following heroes, or the opposite (it usually takes some time)
- *battle*: confrontation between heroes and villains (usually includes fighting/shooting)
- *romance*: between the hero and the love interest
- *victory good*: good characters win a battle
- *victory bad*: bad characters win a battle
- *preparation*: preparing to the battle - setting up the armor, training, jogging, etc.
- *despair good*: desperate mood of heroes, normally not during fight, but connected to the global battle
- *joy bad*: villains express emotions (usually laugh)
- *good argue bad*: good and bad characters have an oral debate
- *good argue good*: good characters argue among each other
- *bad argue bad*: bad characters argue among each other

We allow beat-events of different classes to temporally overlap. If possible, beat-event boundaries are selected such that the event is recognizable from the segment alone.

Beat-event definitions are as much uniform over all the movies as possible. E.g. there are few debates annotated in Rambo, since most of the debates are less prominent than in Rocky.

The division of characters into "good" and "bad" is fixed per movie. It can however change within the franchise.

Event definitions

Pursuit

Short definition: villains are following heroes, or the opposite (it usually takes some time)

Synonyms: chasing, following; **difficult:** running, approaching, escaping, crawling

Full definition: During pursuit, one of the parties (“good” or “bad”) is following the other, either on foot, or in a vehicle (car, helicopter, etc.). Both the persecutor and the persecuted are aware of the pursuit: the former is trying to catch up and the latter to escape. There is a nonzero distance between parties, so that they mostly interact by shooting. There can be more than 1 character in each of the parties.

Except rare cases, pursuit is fast and dynamic. Another distinct attribute of the pursuit is the tense state of both parties.

Special cases:

- During a car pursuit scene, it often happens, that characters fight in a moving car. We count it as a *battle*, but not as a *pursuit*.
- Running from danger should not be annotated as *pursuit*.



Sample snapshots from *pursuit* events

Battle

Short definition: active confrontation between heroes and villains

Synonyms: fighting, shooting; **difficult:** explosion, single shots, torturing

Full definition: During a battle, good and bad characters try to hurt each other. It can be a hand-to-hand fight or an armed conflict. One or both parties can be inside a vehicle such as car, plane, helicopter.

A battle consists of several attacks by each party. Usually when one party attacks, the other one tries to defend: hide, block or escape from being hurt. Sometimes they attack simultaneously.

Special cases:

- In Rocky, there is one main battle per movie + several minor battles; each round is a separate event.
- In Rocky, a boxing battle during training is annotated as both *battle* and *difficult preparation*.
- On the contrary, shooting practice is considered as *preparation* and *difficult battle*.
- Threatening with arms should not be considered as *battle*.



Sample snapshots from *battle* events

Romance (good)

Short definition: expression of mutual feelings of two good characters

Synonyms: love, **difficult:** mutual attraction

Full definition: A romance happens between two characters of the same party, mostly between the main hero and his love interest. It is an expression of their mutual feelings to each other and usually implies hugging, kissing, smiling and also flirting. In most cases, the characters stand close to each other and there is an eye contact.

Romance episodes happen when heroes are being separated without their will, or when they rejoin each other after a long separation.

Special cases:

- In Rocky, dialogues between the hero and his love interest are often annotated as difficult *romance*



Sample snapshots from *romance* events

Victory (good / bad)

Short definition: good / bad characters win a battle or pursuit

Synonyms: winning, happy end, knockout; difficult: knock-down

Full definition: (for *victory good*, *victory bad* is the opposite) Victories happen in the end or right after a battle or a pursuit. However, not every battle nor pursuit will have a winner. If there is a temporary advantage during the battle, it is not considered as a full victory. The *victory good* event also happens when bad characters lose.

A victory usually implies positive emotions of the characters, although the winners are often exhausted.

Winning a battle means either destroying the major part of the enemy forces or capturing the enemy.

Winning a pursuit means either catching the pursued or escaping from the persecutor.

Special cases:

- In Rocky, there is one victory in the end of the battle. Knock-downs are counted as difficult victories.



Sample snapshots from *victory good* events



Sample snapshots from *victory bad* events

Preparation

Short definition: preparing to the battle - training, jogging, setting up the armor, etc.

Synonyms: training, drill, jogging; difficult: setting up weapons/equipment, recharging gun, handwork (e.g. bomb installation)

Full definition: Preparation is aimed to increase the chances of winning in the expected battle. For that, characters either improve their physical forces (e.g. jogging, muscle-strengthening), practice required skills (e.g. shooting practice) or imitate the battle with partners.

Except for running, preparation usually takes place in a gym or a similar building. In many cases, characters of the same party prepare together. Often there is a coach that guides the preparation process.



Sample snapshots from *preparation* events

Despair good

Short definition: desperate behaviour of the heroes, normally not during fight, but connected to the global battle

Synonyms: wail, cry, severe fatigue, exhaustion, “all is lost”, depression, shock, fright; difficult: heavy breathing, sad mood

Full definition: Despair or desperation is a state in which all hope is lost or absent [c.f. Wordnet]. Our definition is broader. A despair event contains visual and aural signs of despair: crying, wailing, moaning, etc. In general, people in despair cannot normally communicate with other people. They are not listening others or not saying anything. A strong fright of a hero can be viewed as a short *despair good* event.

In most cases there are 1–3 heroes in despair. A special case - panic in public place - many people are scared and screaming.

Heroes can be suffering because of physical wounds or psychological stress. In both cases heroes express negative emotions. In rare cases, when a hero is seriously wounded, he/she may talk to other person to reduce hurt.

There is a special case when the global battle finishes and the heroes (esp. women) cannot believe in the happy end and start crying. This should not be considered as *despair good* event.



Sample snapshots from *despair good* events

Joy bad

Short definition: villains show dominance or express joyful emotions

Synonyms: laugh, sarcasm, arrogance, exult, gloat over (misfortunes of others); difficult: transient grin, quick smile

Full definition: When villains succeed in their cruel plans, they start to celebrate it. It often happens before the global battle finishes. It usually appears as a close-up on villain’s face. The particular expression of the villain varies in different movies. It can be a sarcastic laugh, or angry face, or arrogant look at the heroes, or even happy face.

Sometimes it happens that several villains laugh together. However, if bad characters laugh while joking with good characters, this should not be considered as a positive.

Special cases:

- Fighters in Rocky do not smile as much as villains in other movies. Therefore many of *joy bad* examples are annotated as difficult.



Sample snapshots from *joy bad* events

Good/bad argue good/bad

Short definition: intense discussion with a strong disagreement

Synonyms: argument, debate, quarrel; difficult: objection (protest), argued disobedience

Full definition: Argument is an intense discussion with a strong disagreement. Not only each party expresses his/her opinion, but, more importantly, tries to object strongly to the opponent. In a typical tense argument parties raise their voices, may provoke a fight.

In a complete argument we hear both parties arguing. If one of the opponents is mild, tries to find a compromise and to calm down the other, this should not be considered a true argument. This often happens in the end or after the argument.

In some arguments one character is in a dominant position (by means of the weapons, number of people, threatening etc. or due to the hierarchy). In that cases the oppressed party tries to loosen the dominance, while the other tries to keep pressure.

In a civilized debate, the characters do not shout at each other, but rather speak in turn. Insisting tone of voice and disagreement with the opponney distinguish the civilized debate from a simple discussion. It mostly happens for *good argue bad* case.

Special cases:

- Argument good-bad does not include “giving orders” and other 1-side arguments.
- In Rocky, main hero’s coach (Mickey) usually criticizes his trainee and therefore their dialogues often resemble debates. If there is no serious debate, it is assigned a difficult *good argue good* label.
- Argument events do not include the introductory speech, but only the intense part.
- In Indiana Jones, discussion of the main hero with friends often looks like a difficult argument.



Sample snapshots from *good argue bad* events



Sample snapshots from *good argue good* events



Sample snapshots from *bad argue bad* events

2 Mapping of the beats to beat-events

Blake Snyder's Beats	Corresponding Beat-Events	ActionMovies Beat-Events
Opening image (p. 1): Sets the tone for the story and suggests the protagonist's primary problem.	-	pursuit: villains are following heroes, or the opposite (it usually takes some time)
Theme is stated (p. 5): A question or statement, usually made to the protagonist, indicating the story's main thematic idea.	-	battle: confrontation between good/bad characters (usually includes fighting or shooting)
Set-up (p. 1-10): An introduction to the main characters and setting—the background.	-	romance: between the hero and love interest
Catalyst (p. 12): A major event that changes the protagonist's world and sets the story in motion.	-	victory good: good characters win a battle
Debate (p. 12-25): A question is raised about the choice now before the protagonist. Often this section lays out the stakes for the journey ahead.	good-argue-bad good-argue-good bad-argue-bad	victory bad: bad characters win a battle
Break into Act II (p. 25-30): The hero definitively leaves his old world or situation and enters a strange new one.	pursuit (DH4,LW3,Ra1) good-argue-good (Ro1)	preparation: preparing to the battle - setting up the armor, training, jogging, etc.
B-story (p. 30): A secondary plotline that often fleshes out side characters—frequently a mentor or a love interest—who assist the hero on his journey.	romance	despair good: desperate mood of good heroes, normally not during fight, but connected to the global battle
Fun and games (p. 30-55): Snyder says this section offers "the promise of the premise." It's an exploration of the story's core concept that gives the story its "trailer-friendly moments." It's usually lighter in tone, and it typically builds to a big victory at the midpoint.	romance good-argue-good (Ro1,Ro2) battle (Ro3)	joy bad: villains express emotions (usually laugh)
Midpoint (p. 55): The A and B stories cross. The story builds to either a false victory or (less often) false defeat. New information is revealed that raises the stakes.	victory-good victory-bad	good argue bad: heroes and villains have an oral debate
Bad guys close in (p. 55-75): After the victory at the midpoint, things grow steadily worse as the villains regroup and push forward.	battle (DH4,IJ3,Ra2,Ro3) joy-bad (DH1,DH4,Ro1) despair-good (DH1,Ra2) pursuit (DH1)	good argue good: good characters argue among each other
All is lost (p. 75): Mirroring the midpoint, it's usually a false defeat. The hero's life is in shambles. Often there's a major death or at least the sense of death—a reference to dying or mortality somehow.	victory-bad despair-good	bad argue bad: bad characters argue among each other
Dark night of the soul (p. 75-85): A moment of contemplation in which the hero considers how far he's come and all he's learned. It's the moment in which the hero asks, "Why is all this happening?"	despair-good (Ra4,Ro4,Ro3)	
Break into Act III (p. 85) A "Eureka!" moment that gives the hero the strength to keep going—and provides the key to success in Act III.	romance (Ro1,Ro4) despair-good (LW1,LW2,LW3) good-argue-good (Ro3)	
Finale (p. 85-110) Relying on all he has learned throughout the story, the hero solves his problems, defeats the villains, and changes the world for the better.	battle victory-good pursuit (Ra4,Ra2,DH4)	
Final image (p. 110). A mirror of the opening image that underlines the lessons learned and illustrates how the world has changed.	victory-good romance (IJ2, Ro1, LW3, DH4) good-argue-good (IJ3, LW3) despair-good (DH1,DH2,LW3) victory-bad (Ro1, Ra1)	

Table 3: Mapping of the beats to beat-events. One of the conclusions of the paper is that the global temporal structure is not constrained by a well defined beat-event order. Therefore the mapping here relies more on the definition of beats and beat-events, than on the temporal ordering. The bold beat-event matches are common and represent prominent beats; the other are more special cases. The beginning of the movie is less standardized and contains little action, therefore is hard to describe in terms of well-defined events. Note that *preparation* does not match precisely any beat, but always happens right before the final battle in the *Rocky* franchise. In parentheses we show the abbreviated movie names where each match happens.