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A Logical Framework for Weak Permissions in Criminal Procedure

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Abstract. We study weak permissions in criminal trials, which require judicial determination due to the absence of explicit prohibitions. We thus sketch a dialogue game to address this issue, analyzing argumentative dynamics with common and private knowledge. By applying various argumentation semantics, we clarify the procedural implications for weak permissions.

Keywords. Weak Permission, Criminal Procedure, Defeasible Deontic Logic

Weak permissions, often seen as the dual of obligations ($\mathsf{P}a \equiv \neg\mathsf{O}\neg a$) [1,15,14], hold operational significance in legal contexts, especially criminal trials [11]. They arise not from explicit prohibitions, but from the legal system's allowance for actions, making them inferred rather than stated. Our idea is that analyzing weak permission within the dynamics of a criminal trial must be founded on the understanding that it is the judge's responsibility to determine whether an action is weakly permitted [2]. This responsibility arises precisely because what is deemed weakly permitted is not clearly established by the criminal code nor by any precedent in criminal case law.

In [8] it was argued that court proceedings exemplify the so-called argument games with *incomplete information*, i.e., dialogues where the structure of the game is *not* common knowledge among the players. The concept has been later formally and computationally investigated [9,6] and extended to also model legislative dialogues [10,12]. Dialogues with incomplete information are typical in the criminal proceedings, where a prosecution and defendant do not not know what arguments her opponent will employ. A dialogue game $\mathcal{D}$ is initiated by the prosecution (Pr), who has the burden of proving the defendant (Def)'s guilt, and this Claim must be established beyond a reasonable doubt. The dialogue involves an alternating sequence of interactions (called turns) between Pr and Def: Pr attempts to assess the validity of Claim, whereas Def has the burden of proof on defeating it. Each participant has a private knowledge regarding some rules of the knowledge base (the theory). Other rules, along with all the facts, represent the common knowledge of both participants. By putting forward a private argument during a step of the game, the agent increases the common knowledge.

Pr's $\mathsf{Claim}_{\mathsf{Pr}}$ typically consists in two sets of statements: a set $\mathsf{Claim}_F = \{a_1, \dots, a_n\}$ of *evidential claims* (such as "Def did b") and a set $\mathsf{Claim}_{\mathsf{O}} = \{\mathsf{O}{\sim}a_1, \dots, \mathsf{O}{\sim}a_n\}$ of *deontic claims* (such as "b is prohibited by the criminal code"). In a similar way, we have two different types of rules: *evidential rules*, having the form $r : a_1, \dots, a_n \Rightarrow b$, and *deontic rules* having the form $s : a_1, \dots, a_n \Rightarrow_{\mathsf{O}} b$: if r is applicable then we can derive that b is the case, if s is applicable then we can prove that b is obligatory. The set R of all evidential and deontic rules, which are used to build arguments, is partitioned into three subsets: a set R_{Com} known by both players and two subsets R_{Pr} and R_{Def} corresponding, respectively, to Pr's and Def's private knowledge.

Consider a setting where $F = \{a, d, f, g\}$ is the common knowledge of indisputable facts, $R_{\mathsf{Com}} = \emptyset$, and the players have in $\mathcal{D}$ the following rules:

$$R_{\mathsf{Pr}} = \{r_1 : a \Rightarrow b,\ r_2 : d \Rightarrow c,\ r_3 : c \Rightarrow b, r_4 : g \Rightarrow_{\mathsf{O}} {\sim}b\}$$
$$R_{\mathsf{Def}} = \{r_4 : c \Rightarrow e,\ r_5 : e, f \Rightarrow \neg b, r_6 : c \Rightarrow_{\mathsf{O}} {\sim}b\}.$$

If Pr's claim is $\mathsf{Claim}_{\mathsf{Pr}} = \langle \mathsf{Claim}_F = \{b\}, \mathsf{Claim}_{\mathsf{O}} = \{\mathsf{O}{\sim}b\}\rangle$ and Pr plays $\{r_1 : a \Rightarrow b,\ r_4 : g \Rightarrow_{\mathsf{O}} {\sim}b\}$, then Pr wins the game. If Pr plays $\{r_2 : d \Rightarrow c,\ r_3 : c \Rightarrow b,\ r_4 : g \Rightarrow_{\mathsf{O}} {\sim}b\}$ (or even R_{Pr}), this allows Def to succeed. Here, a minimal subset of R_{Pr} is successful.

This discussion suggests how weak permissions obtain in criminal trials:

Intuition 1. *Let $\mathcal{D}$ be a dialogue where* Pr*'s claim against* Def *consists in the sets* $\mathsf{Claim}_F = \{a_1, \ldots, a_n\}$ *and* $\mathsf{Claim}_{\mathsf{O}} = \{\mathsf{O}{\sim}a_1, \ldots, \mathsf{O}{\sim}a_n\}$*. If* Pr *succeeds in $\mathcal{D}$, each a_k, $1 \leq k \leq n$, is not weakly permitted; if* Def *succeeds in $\mathcal{D}$ each a_k is weakly permitted.*

In common-law systems, various evidential proof standards are distinguished (in order of strength) [4,3]: *scintilla of evidence*, *preponderance of evidence*, *clear and convincing evidence*, *beyond reasonable doubt*, and *dialectical validity*. [5] reconstructed these standards in Defeasible Logic by proof-theoretically distinguishing several *types of conclusions* that can be obtained a theory D. More precisely, $\pm\#l$ means that l is provable (resp. not provable) in D where $\# \in \{\partial, \delta, \sigma, \sigma^-\}$, with the following correspondences, among others: (a) ∂ for *preponderance of evidence* (standard skeptical argumentation semantics for DL); (b) δ for *beyond reasonable doubt* (grounded semantics); (c) σ for *substantial evidence* (a variant of credulous semantics); (d) σ^- for *scintilla of evidence* (a weaker variant of credulous semantics). The relative strenght of proof standards is as follows: $+\delta \rightarrow +\partial \rightarrow +\sigma \rightarrow +\sigma^-$ and $-\sigma^- \rightarrow -\sigma \rightarrow -\partial \rightarrow -\delta$.

Moving to dialogues with evidential and deontic rules, we have to resort to Defeasible Deontic Logic [13,11]. Since we have two consequence relations, we duplicate the types of conclusions. For example, $+\delta_{\mathsf{O}}l$ means that l is provable (grounded semantics) with mode O, i.e., as an obligation, while $-\delta_{\mathsf{O}}\neg l$ allows for proving that l is weakly permitted. Under these assumptions, we can define the following notions.

Definition 1. *If D is a theory and $\# \in \{\delta, \partial\}$, then l is* #-weakly permitted *iff $D \vdash -\#_{\mathsf{O}}{\sim}l$.*

Definition 2. *Let $\mathcal{D}$ be dialogue where* $\mathsf{Claim}_{\mathsf{O}} = \{\mathsf{O}{\sim}l_1, \ldots, \mathsf{O}{\sim}l_n\}$ *and $\# \in \{\delta, \partial\}$. Any literal l_k, $1 \leq k \leq n$, is* #-weakly permitted *in $\mathcal{D}$ iff (a) $\mathcal{D}$ terminates at turn i; (b) $D^{i-1} \vdash -\#_{\mathsf{O}}{\sim}l_k$.*

Notice that weak permissions cannot be characterized for all standard of proofs. Indeed, Proposition 3 of [7] establishes a fundamental distinction in how sceptical and credulous standards affect the interpretation of permissions. Specifically, it underscores the impossibility of simultaneously having a proof for both $\mathsf{O}l$ and $\mathsf{O}\neg l$ only in sceptical frameworks. The result does not hold for $\# \in \{\sigma, \sigma^-\}$: $D \vdash +\#_{\mathsf{O}}l$ and $D \vdash +\#_{\mathsf{O}}{\sim}l$ may both obtain with σ and σ^-, because these are credulous standards, hence they allow for arguments supporting both $\mathsf{O}l$ and $\mathsf{O}{\sim}l$, reflecting hard difficulties to describe weak permissions in credulous deontic reasoning and in more permissive logical scenarios often found in complex legal disputes.

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