# 5.4 An Example of Speech Understanding / Spoken Dialogue System — Statistical Approaches Trained by A Corpus

- **Task**
  - telephone directory services for financing/ banking organization in Taipei area (total 2679 titles)

- **Utterance Analysis**
  - 請幫我查一下那個(台灣銀行)的電話號碼？麻煩您再講一次？
  - Key Phrase : frequently appearing in corpus, automatic extraction from corpus possible using statistical approaches

    desired data : existing in target database

    filler : others
  - phrase lattice/phrase N-gram

    prob[ $ph^{j}$ | $ph^{j-2}$ , $ph^{j-1}$ ]  $ph^{j}$ : the j-th key phrase

- **Semantic Concept**
  - inquiry : 查一下，請問，請找一下
    organization type : 公司、銀行、證券
    request for repetition : 再說一次，聽不清楚
  - key phrases with similar roles in utterances
    automatic clustering of key phrases into concepts possible using statistical approaches
  - An Example
    utterance : 請幫我查一下(台灣銀行)的電話號碼是幾號？
    key phrases : (查一下) – (銀行) – (電話號碼)
    concepts : (Inquiry) – (organization type) – (phone no.)
  - concept lattice / concept N-gram
    $prob[\ C^{j} \mid C^{j-2}\ ,\ C^{j-1}\ ]prob[\ ph^{j} \mid C^{j}\ ]$
    $C^{j}$ : the concept for the j-th key phrase
  - HMM's or Fuzzy Memberships possible
- **Speaker's Intention (Speech Action Type, SAT)**
  - identified by a concept sequence plus keywords in target database

- **Dialogue Manager**
  - identify speaker’s intention
  - receive/confirm all information necessary for a task
  - ask for information not yet received
  - perform the instructed functions
  - generate response sentences
  - consider discourse/dialogue history
  - control dialogue flow
- **Some Initial Work on Chinese Language Understanding**
  - lexicon knowledgebase, Information-base Case Grammar (ICG), sentence parser