the typical SSM (Spring, Spring Boot, Mybatis) framework to save development time. Fig. 2 shows the current class diagram designed for the system, with content to be improved.

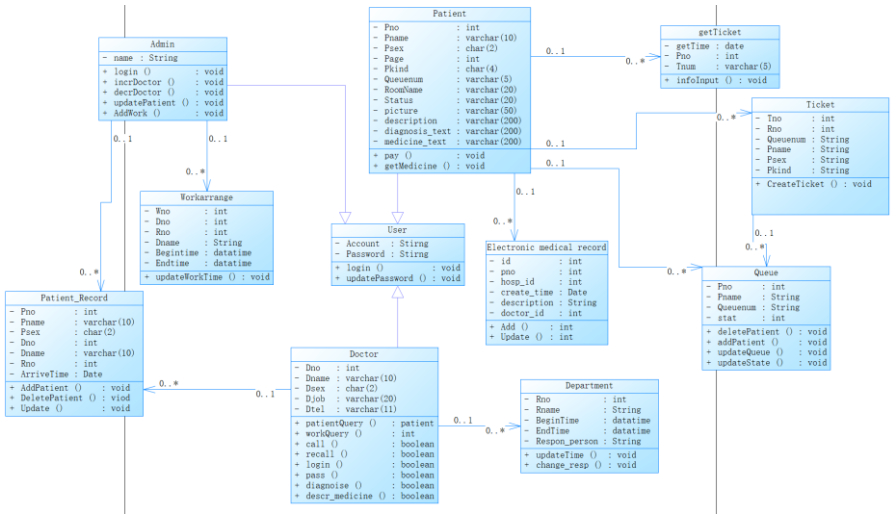

Figure 2 – Class Diagram (OOM) for Hospital Information System

For application scenario. Patients can log in to their accounts through the mobile hospital app and make appointments directly without having to fill in basic information multiple times. Not only that, when they encounter minor illnesses such as mild flu that do not require a hospital visit, they can communicate with doctors online to ask for advice, get doctor's advice through text descriptions, upload pictures and videos, and make online payments; patients can also access their own electronic medical record information through identity verification to provide it to doctors for consultation. Doctors can prescribe medication and manage hospitalization for patients through the hospital Web server, without the need for handwritten credentials.

Compared with most of the existing hospital information systems, this system aims to make the whole consultation process and the whole hospital management more “paperless” and more intelligent through the design of online and offline consultation and electronic medical records, and to replace paper data by mobile phones and computers for cloud data processing, which is faster, safer, and more convenient.

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背单词软件——多语言同行

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Summary. *In today's social life, people always have more or less foreign language learning needs for work or study. Words are the most basic components, and memorizing words has naturally become a compulsory course for foreign language learners. For some special personnel, such as Chinese in Belarus, they may have the need to learn multiple languages at the same time, such as English and Russian. This is the main difficulty that this software is designed to solve.*

在现在的社会生活中，由于工作或者学习需要，人们或多或少会有外语的学习需求。而对于一门语言来说，单词是最基本的组成成分，背单词自然也就成了外语学习者的必修课。对于一些特殊人员而言，比如在白俄罗斯的华人，他们可能同时有多种语言的学习需求，比如英语、俄语。这就是本软件旨在解决的主要困难，为多语言学习者提供使用帮助。

现在已存在的软件市场中常用的外语学习软件常常是以英语为主，而少有其他语言的，即使有，也十分简陋，远远不如英文学习软件中的各种学习方法来的多样化。其实外语词汇

中有相当一部分是来自相同词源的，比如俄语中的“чай”和中文中的“茶”(chá)，英语中的“restaurant”和俄语中的“ресторан”。这些同源的词汇不仅是在读音上，有的在字形上也有很大的相似性。如果一个使用者有同时学习多种语言的要求的话，同源词汇同时记忆将更加有益于记忆和理解，这将减少很大一部分的记忆负担，甚至在一定程度上增加背单词的趣味性。

网上有很多文章和课程说背单词没用的，但是深入分析一下这些言论，无非是为了迎合受众，给这些人割韭菜。因为背单词是一件很枯燥无味的，甚至说是痛苦的事情。网传的“无痛的英语学习方法”在市场上大行其道，期中不乏，使用各种技巧给学习者一种他们可以学好英语的而不用付出精力的错觉。对于非母语学习者来说，想要高效快速地提高自己的综合外语能力，大量重复和记忆单词是必然的方式。

海量词汇的记忆对任何一个外语学习者来说都不是一件容易的事，尤其是在没有合理规划的前提下，学习到一定程度之后，会发现复习量非常大。而且在庞大的词汇量复习中，大部分时间复习的往往是那些“熟面孔”的单词，不仅效率低下，而且不可持续，很容易就把学习外语的热情消耗殆尽。所以一个科学高效的复习计划是在外语学习过程中不可或缺的一环。对于本软件而言，在词汇表数据库中记录单词的学习时间和已复习该单词的次数，以及在重复复习该单词的过程中使用者所消耗的回忆时间和准确程度，加权计算出使用者对该单词的敏感程度。所谓敏感程度，指的是用户对于某个单词的，主观的，特殊记忆感受。举个例子，溺水者在被救援时，看到了救援人员身上穿着的衣服上有“rescue”或者“assist”字样，那么溺水者在之后对“rescue”或者“assist”就会相当敏感，相对的，对该词汇的记忆也会相对其他词汇而言更加深刻，更加难以遗忘。这表明溺水者对“救援”词汇有强敏感度。相反的，对于时常坐在教室而远离工厂的学生而言，“manufacture”和“production”都有“产品”的意思，但对于学生而言，这些单词也仅仅只有字面上的“产品”的意思，而没有更加深入的感性认知，一段时间不去记忆就很容易遗忘。这表明学生对“产品”词汇有弱敏感度。根据使用者的记忆和复习数据可以粗略估计出使用者对该单词的敏感度，然后根据单词的敏感程度来安排复习计划中单词的出现频率，达到针对复习提高效率的目的。配合艾宾浩斯(H.Ebbinghaus)遗忘曲线（见图 1）的中的人类对学习的遗忘规律，使最终的复习计划更加合理。

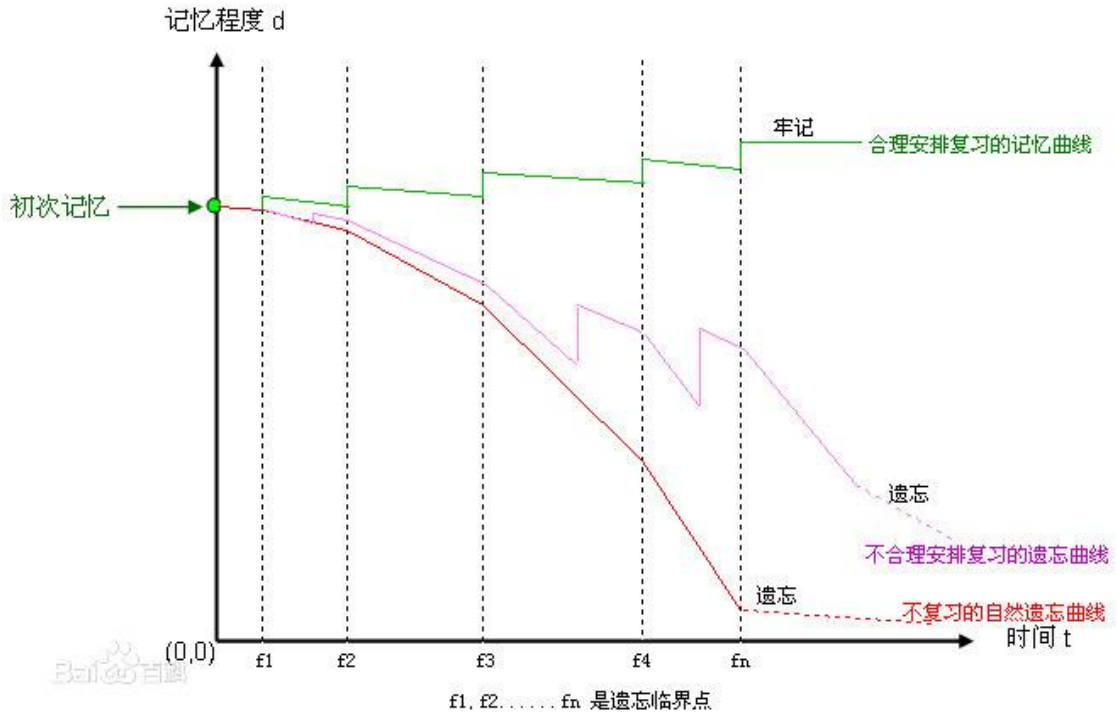

图 1 – 艾宾浩斯遗忘曲线

本软件使用 Java 编写，应用于安卓平台。使用者可自选多门外语同时学习，并且在单词的学习和复习时，多种外语的单词形式、释义、音标等信息同时显示在同一屏幕内便于使用者类比记忆。在词汇表的选用上，既可以自行导入也可以使用系统预置的词汇数据库中的词汇进行学习，复习计划将由系统根据前文所介绍的“单词敏感度”机制配合艾宾浩斯遗忘曲线安排。使用者也可以自定义每日学习和复习的强度。相信在未来，更多科学高效的外语学习方法将相继出现，多语言学习将变得更加友好，外语学习者们也能切实体会到科技带来的便利。

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A NOVEL LITHIUM BATTERY ANODE-CATHODE DISTANCE DETECTION METHOD BASED ON X-RAY IMAGES

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Summary. *Lithium battery is a promising energy source that can used in power the electric motors of a battery electric vehicle or hybrid electric vehicle. However, in recent years, many serious safety accidents in electric vehicle that caused by the defect of the anode and cathode harm the industry. Therefore, we proposed a novel distance detection method, which can detect the defect of the anode and cathode automatically with high accuracy and speed.*

Battery testing and failure analysis is important in helping improve design and confirm the correct working of battery internal features. Digital radiography and computed tomography X-ray inspection may examine the internal electrode arrangement after assembly and then find out the defects. One of the potential defects of the battery is caused by the improper distance between anode and cathode, either too large or too small distance may obviously reduce the lifetime of the battery and then leads to the incident [1]. Traditional detection method of battery defect is conducted by using human labor, whose efficiency is low and examining accuracy is not satisfactory, therefore, we proposed a novel lithium battery anode-cathode distance detection method that based on X-ray images.

The proposed method uses the X-ray images of the battery as input and outputs the distance values between all pairs of the anode and cathode, on which it is easily to judge the current battery is qualified or not. The proposed method mainly consists of three basic stages: key points detection stage, key points matching stage, relative distance measurement and quality examine stage.

In the first place, during key point detection stage, all cathode and anode points are detected by using a modified Yolo method. Yolo [2] method has become one of the most popular neural-network based object detection methods due to its speed and accuracy after it has firstly introduced in 2015. Yolo method can provide us both the positioning and classification information. In order to adapting our task, we modified the original Yolo architecture and algorithm for achieving the transfer learning.

Secondly, during key point matching stage, we adopted Hungarian algorithm to pair the anode and cathode. Hungarian method [3] is a combinatorial optimization algorithm that solves the assignment task in polynomial time. For our task, supposed that there are N_1 anodes and N_2 cathode ($N_1 < N_2$), we first construct a $N_1 \times N_2$ matrix M, and for *i-th* anode and *j-th* cathode, their Euclidean distance (assignment cost) are filled in the position of M (i, j) and then this assignment can be solved by using Hungarian method.

The last stage is relative distance measurement and quality examine. During this stage, the distance between each pair of anode and cathode are simply calculated since the coordinate of these two points are known. And then we compare each of them with given distance ranges, if all the computed distances are within the given range, then this battery is qualified, otherwise this battery is not qualified.